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WOOD FOR MILLWORK

ROBERT E. BENSON

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2431	MILLWORK PLANTS		
	ESTABLISHMENTS:		
	TOTAL.....NUMBER..	3 770	169
	WITH 20 EMP. OR MORE....DO..	748	132
	ALL EMPLOYEES:		
	TOTAL.....DO..	65 283	16 913
	PAYROLL.....$1,000..	320 817	81 812
	VALUE ADDED, ADJUSTED.....DO..	524 041	135 383
	VALUE OF SHIPMENTS.....DO..	1 270 613	358 143
	ER AND PLYWOOD PLANTS		
	BLISHMENTS:		
	.....NUMBER..	641	208
	EMP. OR MORE....DO..	503	191
	.....DO..	66 155	36 918
	$1,000..	324 746	191 900
		559 211	334 [illegible]

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INTERMOUNTAIN FOREST AND RANGE
EXPERIMENT STATION
Ogden, Utah 84401

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USDA Forest Service
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WOOD FOR MILLWORK

ROBERT E. BENSON

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ABSTRACT

A growing demand for millwork products is anticipated in light of the projected levels of residential construction. The millwork industry appears to have the manufacturing and marketing capacity to meet this need, but there is some uncertainty about the availability of lumber suitable for millwork manufacture. The use of a wide range of species and grades of lumber might help increase the supply of lumber suitable for millwork products. However, more information is needed on the technical and economic requirements for wood used in millwork, and also about the amount and availability of timber that is potentially suited to produce lumber for millwork products.

INTRODUCTION

The wood industry faces a tremendous challenge in this decade — that of providing, in part, materials for 2.6 million new and rehabilitated residential housing units per year, to meet the acute housing needs of the nation. The bright prospect of this much building activity, assuring strong markets for building materials and skills, is dimmed by the threat of a shortage of wood products in the immediate future.

After several years of reasonably stable prices and markets, the wood industry was buffeted in 1966 and 1967 by a severe slump in homebuilding followed by the expectation of a boom in building and other wood use. The combination of real and threatened shortages of wood sent prices skyrocketing to alarming levels in 1969, and resulted in congressional hearings, legislation affecting log exports and timber harvest, and administrative directives curtailing federal purchase of wood materials. Although the demand and prices for wood products have since dropped, the public as well as key people in government, the housing industry and the wood industry are taking one of the hardest looks ever at the future, and at the spectre of more wild price gyrations induced by a heavy demand for wood and a short supply. The prognostication of some is that a supply-demand gap will persist throughout the next decade and that substitutes for wood must be developed to meet construction needs.[1]

The purpose of this paper is to appraise the supply and anticipated demand for wood used in millwork. If supply could be measured in board feet of timber, the analysis would be simple in concept, if not in compilation. However, trees standing in the forest are only potential supply. Converting trees into windows, doors, moldings and other millwork items depends upon decisions and capabilities of forest managers, primary processors, and secondary manufacturers. Likewise, the demand for millwork depends on such factors as level of building activity, homeowners' preferences, and the ability of millwork to compete in the market.

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[1] *Robert P. Mayo, former Director, Bureau of the Budget, in a speech to the National Forest Products Association Meeting, Boca Raton, Fla., Nov., 11, 1969, cited the need for satisfactory substitutes to supplement softwood supplies. The report of the Cabinet Committee on Economic Policy, Task Force on Softwood Lumber and Plywood, released by President Nixon on June 19, 1970, directed the Secretary of Housing and Urban Development in cooperation with the Secretaries of Agriculture and Commerce to continue programs to develop and utilize substitute materials.*

MILLWORK IN THE MARKET

The demand for wood in millwork products depends primarily on the amount of construction activity in the country. New residential construction creates the largest segment of the millwork market, but new nonresidential construction and upkeep and improvements also consume a sizable amount of wood in millwork.

Volume used in millwork and trim, 1969

Activity	Lumber (million board ft.)	Plywood (million sq. ft., 3/8-inch)
New residential	1,943.9	983.0
New nonresidential	58.2	87.5
Residential upkeep and improvement	433.2	192.0
Nonresidential upkeep and improvement	230.0	98.0
All construction	2,665.3	1,360.5

The total amount of millwork products[2] used has tripled during the past two decades. The rate of growth in demand for millwork products and the pattern of yearly fluctuations have been about the same as the growth rate and fluctuation pattern for new residential construction activity (fig. 1).

Of course, millwork includes many different products and growth in demand has not been equal among all. For example, the output of flush doors increased rapidly from 1954 to 1963, while window sash output and the output of panel doors declined in that period. However, some of these trends have since been reversed, according to the most recent (1967) census of manufacture (fig. 2).

A major factor behind market trends has been the impact of nonwood materials, particularly metal windows and screens, and screen doors, on millwork markets (fig. 3). Aluminum windows became increasingly popular beginning in the 1950's; currently the window market is about equally divided between wood and aluminum. Wood kitchen cabinets now hold a major share of the market, but metal screen and storm doors remain strong competitors for wooden screen and storm doors.

Homebuyers have a considerable influence on millwork markets. Although builders almost always make the selection and purchase of millwork (2)[3], they frequently offer buyers a choice of materials and styles, and basically use materials homebuyers in the area will accept.

Recent studies have attempted to explain market preferences for millwork and related finishing products. These studies indicate that choices and preferences often reflect a rather complex interaction among several key factors.

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[2] *Based on the value of shipments.*

[3] *Numbers in parentheses refer to References at the end of this paper.*

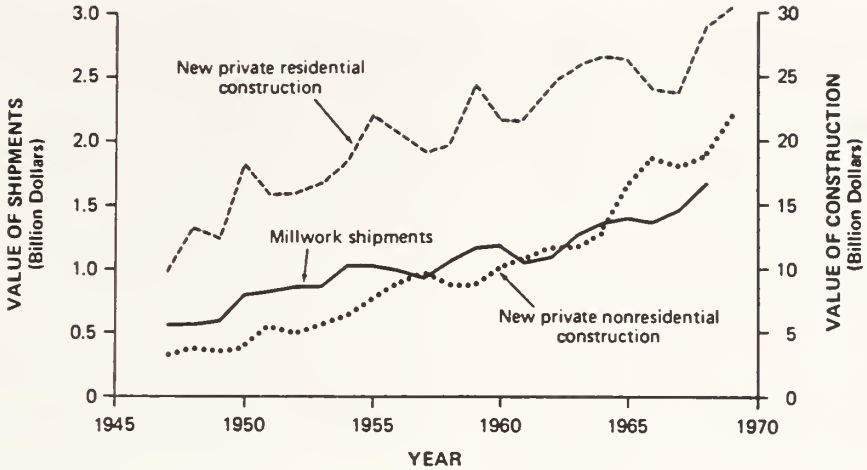

Figure 1 — Value of millwork shipments and construction.

For example, image, appearance, and esthetic appeal are considered highly important. One study showed homeowners considered genuine hardwood wall paneling "luxurious" and "rich," but viewed hardboard paneling with wood grain printed on as imitation (5). On the other hand, there has been a recent trend toward more elaborate panel type doors, particularly for front entrances. However, many of these doors are made from metal, molded wood fiber, or other material rather than lumber.

Utilitarian and cost considerations often modify the esthetic and prestige factors when a builder decides whether wood or some other material should be used in construction. Wood windows are considered to have a prestigious image and to lend an authentic appearance, especially to traditional style homes. However, aluminum windows predominate in some areas because homeowners want to avoid the repainting or other maintenance and performance problems (3). Builders report that aluminum windows are installed in some houses because their purchase price is lower than that of wood windows and the total installed cost is often 30 to 40 percent less because they require no painting.

Other critical factors in the market outlook for millwork are future trends in style of living and the development of new construction

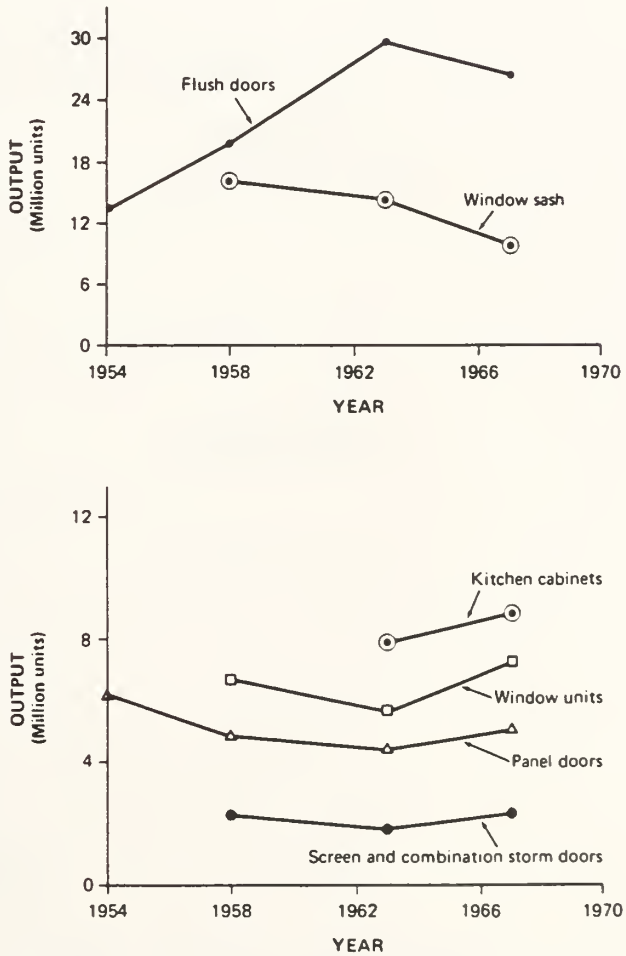

Figure 2 — Output of selected millwork products (Source: Census of Manufacture).

techniques. The current trend in living style has been toward urbanization and apartment living. If this trend continues, the demand for millwork could be reduced because apartment buildings use less millwork than single-family houses. Future construction techniques may be influenced by experiments now being conducted with new building materials. There are numerous experimental houses in which wood products have been replaced by metal, concrete, brick, paper, and other nonwood materials. Several of the "assembly line" houses tested under federal programs to stimulate construction of low-cost housing use little or no wood.

The uncertainties of these factors — preferences, construction types, and style of housing — make it impossible to predict exactly how much lumber will be needed for millwork in the long run. In the immediate future, however, it appears that the demand for wood will grow. The national housing goals that have been adopted reflect a strong potential market; recent trends indicate most millwork products will maintain their share of this market. Consumers generally have a favorable attitude toward millwork products, provided these products can give satisfactory performance and are reasonably competitive in cost with nonwood products.

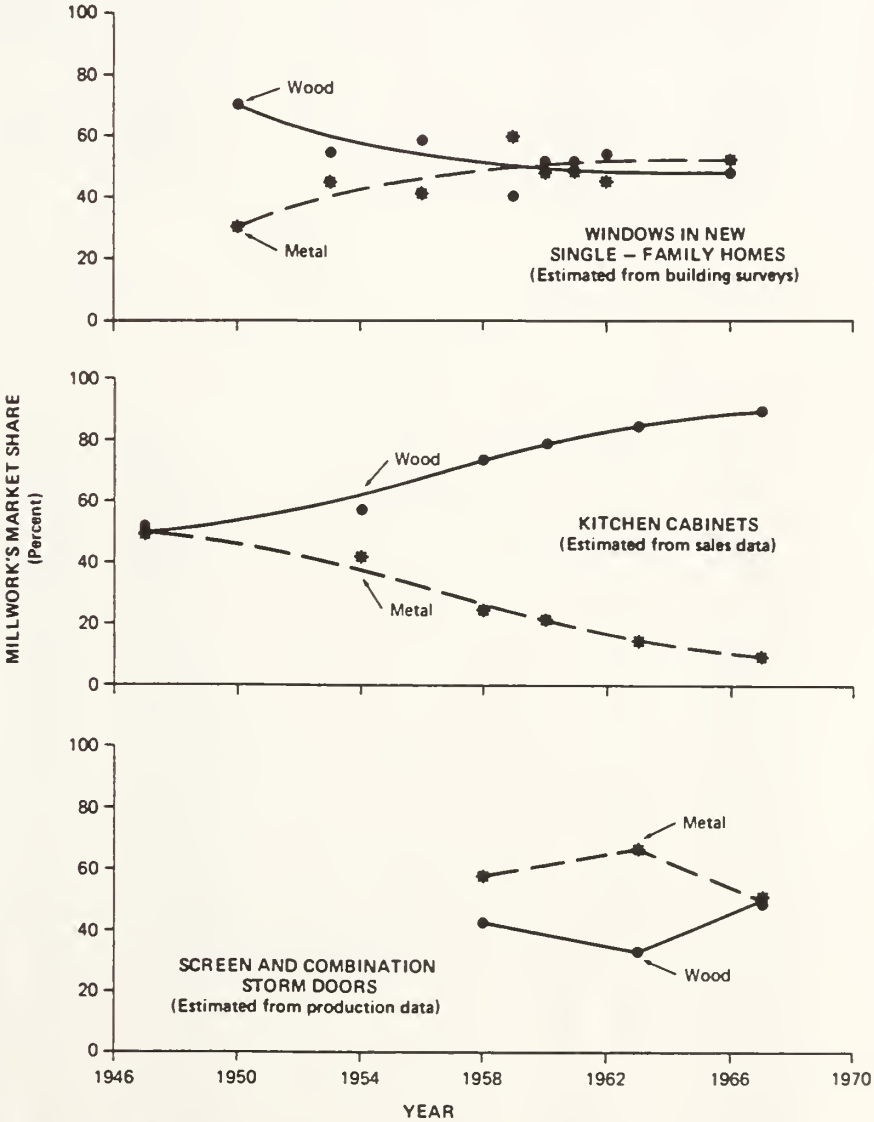

Figure 3 — Millwork's share of market, selected products.

BENSON, ROBERT E.

1971. Wood for millwork. USDA Forest Serv. Res. Pap. INT-89, 10 p., illus.

Summarizes past trends in millwork markets and use of wood in manufacturing millwork products. Suggest research needed to assure adequate future supplies of softwood lumber for millwork use.

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WOOD USE IN MILLWORK

Nearly 2½ billion board feet or equivalent of wood was used for millwork products in 1965 — most of which was softwood lumber (fig. 4). However, the amount of hardwood lumber and such forms of wood as plywood and hardboard accounted for over 25 percent of the wood used for millwork in 1965, compared to 10 percent in 1940. Ponderosa pine and Douglas-fir are the principal softwood lumber species used. The early millwork industry developed around eastern white pine, and later used substantial amounts of southern pine, but western species, particularly ponderosa pine and Douglas-fir, now dominate (6).

A high proportion of the ponderosa pine and Douglas-fir lumber used in millwork is upper-grade lumber. This proportion has increased, according to the following percentile tabulation:

	Ponderosa pine		Douglas-fir	
	1960	1965	1960	1965
High (select and better)	30	47	56	72
Medium (shop, 1 and 2 common)	55	45	31	22
Low (3 common or lower)	15	8	13	6

(Source: Wood used in manufacturing industries, 1965. USDA Forest Serv. Stat. Bull. 440.)

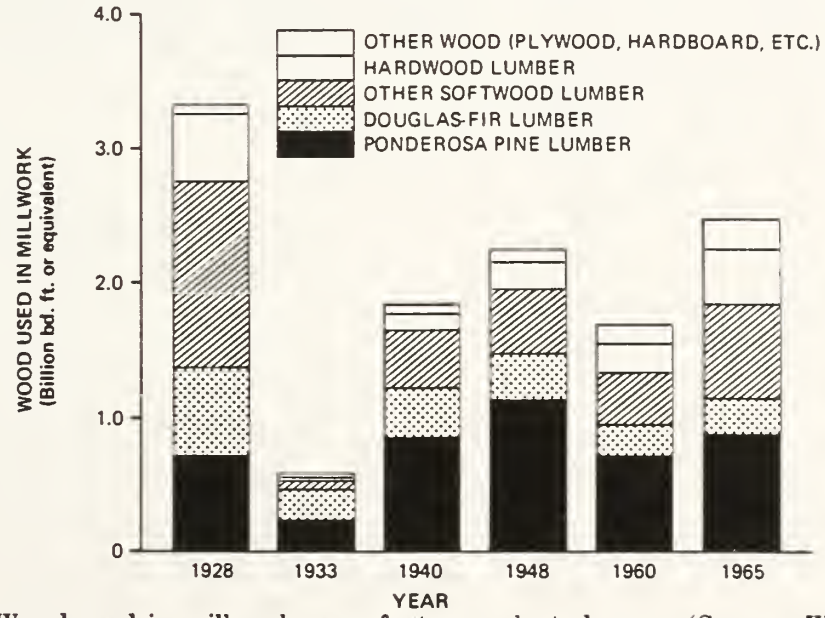

Figure 4 — Wood used in millwork manufacture, selected years. (Source: Wood used in manufacturing industries, USDA Forest Service Statistical Bulletins 353 and 440.)

Recent lumber price trends have been of real concern to the millwork industry. From a fairly stable level in the early and mid-1960's, the price of shop- and select-grade pine and fir nearly doubled during 1968 and 1969. Even when the effect of general inflation in the economy is taken into account, the real price of softwood lumber was 70 percent higher in 1969 than in 1965. Although prices of shop-grade lumber have dropped, they are higher than in 1967, and the prices of select grades have remained high (fig. 5). Estimating material costs and establishing prices for products is difficult when lumber prices change this rapidly. Furthermore, such price gyrations are symptomatic of shortages and uncertainty about lumber supplies which in turn hampers orderly planning of lumber purchases and millwork production.

One potential solution to wood supply and price problems is to shift to alternate materials. As noted earlier, there has been a substantial increase in plywood and hardboard use for some millwork products. One study estimates that half the wood moldings used are finger jointed, and overlain moldings have also had some success in the market (9). However, in items such as windows, doors, door jambs, and louvered panels there has been little substitution for regular lumber (not finger jointed or overlain). Structural requirements, appearance, reluctance of the buyers to accept substitutes, and high costs are the principal reasons why alternate materials have not been more widely used for these products.

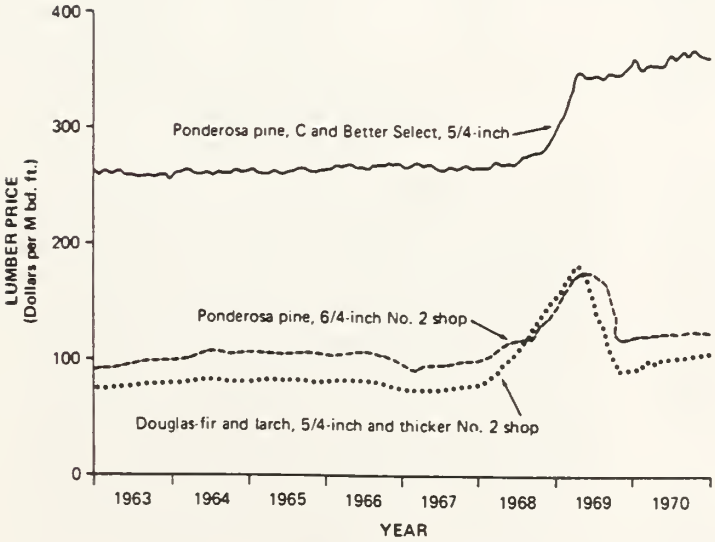

Figure 5 — Wholesale lumber price (WWPA weekly price summary).

Another potential solution would be to use a wider range of species and grades in millwork. Most western softwoods are allowed in millwork products under current industrial and commercial standards, but only a few species are used to any great extent. Ponderosa pine and Douglas-fir account for 63 percent of all lumber used in millwork; in some products, ponderosa pine is used almost exclusively. Specific data on the texture of lumber used in millwork are not available, but in practice fine-textured old-growth material is usually used (8).

A recent survey of millwork manufacturers dealt with the use or testing of 24 different species as alternates to ponderosa pine.[4] Almost half of these were considered technically suitable by the majority of those who tried them. However, many users indicated that ponderosa pine is still their preferred species. Some technical shortcomings were reported for different species, but it appeared from this survey that two other problems may be of greater consequence. First, there are some uncertainties about the basic physical properties and the availability of alternate species, and the changes in manufacturing procedures that would be required if they could be adapted. Second, there appears to be some resistance to alternate species on the part of the manufacturers' customers; this was reported even for some species that were highly suitable technically.

Therefore, it appears that the potential for using alternate species and grades cannot be evaluated until more information is developed on their characteristics and also on the criteria they must meet to be technically and economically feasible for millwork use. Standard grades provide a basis for lumber purchases and provide a general idea of the quality of wood currently used, but comprehensive data on how well lesser known species would work, the specific technical criteria they must meet, and the economics of their use have not been compiled.

[4] *National Woodwork Manufacturers Association survey of members, 1970. Unpublished.*

THE SUPPLY OF LUMBER AND TIMBER FOR MILLWORK

Most millwork manufacturers purchase their lumber in the lumber market; therefore, their supply of materials is dependent on the conditions and activities in the sawmill industry.[5]

In recent years, a notable change in the output of pine lumber products has occurred. Total pine lumber production increased from about 3.2 billion feet in 1960 to 3.7 billion feet in 1965, but it has remained about constant since then. The output of select grades of pine has also remained about constant since 1965, but the output of shop-grade pine has grown substantially.

Percent of total pine lumber

Year	Shop	Select
1959	20.8	14.7
1964	20.4	12.1
1965	23.4	14.2
1966	25.2	11.9
1967	27.3	11.9
1968	26.7	12.1
1969	27.2	11.9
1970	29.7	11.8

(Source: Estimated from Western Wood Products Association weekly price summary of past sales, Inland region.)

The decline in use of common boards coupled with the recent high prices demanded for shop-grade lumber provided an incentive for sawmills to produce more shop lumber. There may be some potential for this increase to continue. Only about half the sawmills in the West are producing shop lumber (1, 4), in part because not all mills are set up to do the more costly sawing, finishing, drying, and inventorying this grade of lumber requires. Periodic high prices for easier-to-produce dimension lumber and boards give less incentive to produce shop-grade lumber. Also, there is reportedly a shortage of qualified shop lumber graders. If these factors can be resolved, shop lumber output might increase, but just how much is not certain.

The question of lumber supplies for millwork ultimately depends upon the amount of suitable timber available. Forest inventory data are not refined enough to estimate the volume of wood suitable for millwork that is standing in the forest. Future supplies are also uncertain because wood quality may depend on management measures not yet undertaken and utilization methods not yet developed. The clear fine textured wood currently preferred in millwork manufacture comes primarily from large diameter old-growth trees (8). At present rates of cut, the harvest of these larger trees will diminish by about 50 percent in the next 30 years (fig. 6).

The actual amount of wood used in millwork need not and probably will not decline by 50 percent, if (a) wood in nonlumber form continues to increase in millwork use, and (b) other species can be adapted. For example, in the inland area of the West[6] only a small proportion of species other than ponderosa pine are now being manufactured into select and shop grades:

Percent of sales, 1969

Species	Select	Shop
Ponderosa pine	11.9	27.2
Western white pine	7.8	3.3
White fir	.6	7.2
Douglas-fir — larch	6.9	4.6
Engelmann spruce	2.7	0
Western redcedar	5.7	.3

(Source: WWPA weekly price summary of past sales, Inland region.)

[5] *Some millwork manufacturers have integrated subsidiary sawmill operators.*

[6] *The States and portions of States lying east of the Cascade Range to the Great Plains.*

The extent to which these other species could be used for millwork products depends on the two factors discussed earlier — their adaptability in millwork products and the feasibility of sawmills sawing them into shop grades or for millwork use. Only when these criteria are available will it be possible to evaluate the quality and availability of current stands in terms of millwork use.

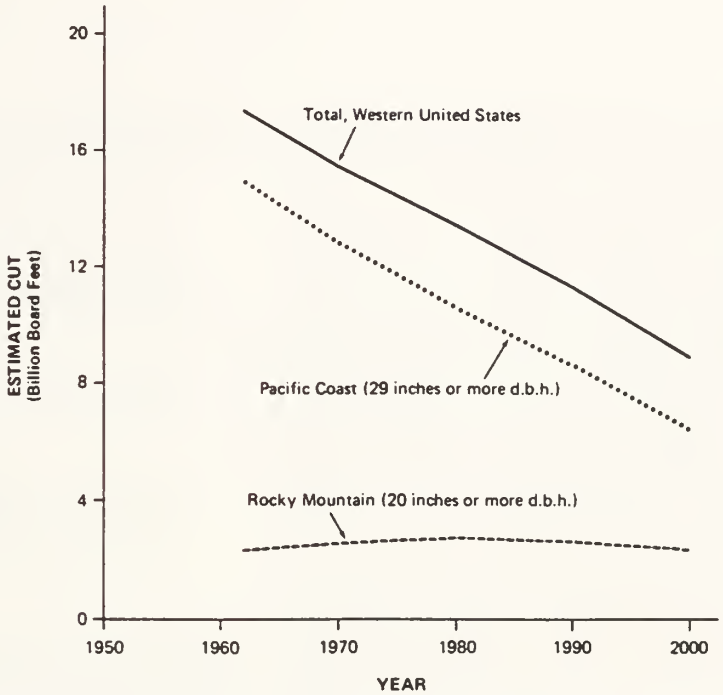

Figure 6 — Projected cut of large diameter trees in the West.

CONCLUSIONS

In a recent editorial, Hal D. Mayhew, editor of Crows Forest Products Digest, commented:

> *The wood window industry has not regained all the ground it had lost to aluminum, but with the present supply situation for raw materials it is obvious that it could not meet the demand if the market was entirely regained.*
>
> *. . . the price and availability of the raw material are taking on a completely different complexion.*
>
> *. . . millwork manufactures . . . must now wonder whether this industry can supply . . . two million housing starts per year . . . (7).*

The projected demand and the anticipated supply of softwood lumber for use in millwork seem to substantiate these comments, even though there are too many unknowns to make a very precise quantitative expression of the situation.

The residential and other construction that is projected for the nation assures a strong demand for millwork products. Although competing materials made a strong bid for millwork markets during the 1950's, more recent trends indicate millwork is retaining or increasing its share of the market. Productivity has improved and it appears the millwork industry is in a good position to compete in markets and to supply housing needs if raw materials are available at a price compatible with competing market situations and competing uses for wood.

The availability of raw material is more difficult to assess. Even though timber supplies are finite, there is an inventory of wood available. Consequently, millwork with its relatively high-value end products should be able to compete in the wood market. However, the economic and technological suitability of the available timber for manufacturing millwork is a major unknown that needs further research.

Projecting the total volume of timber supplies and assuming that millwork will maintain its current share of wood supplies may serve as a useful first approximation. But to make a more definitive study of the supply situation, and to develop a raw material base to supplement the type of wood currently demanded by the millwork industry, it would be desirable to:

1. Define with greater precision the technical and economic criteria that lumber must meet to be used in millwork. The technical criteria include the physical and other properties required in the finished product and in the manufacturing process. The economic criteria include such things as relative cost, quantities needed, availability, and delivery schedules required.

2. Use these criteria to evaluate the technical suitability of alternate wood species, and to estimate the quality (grades and textures) of lumber that would be most common in future second-growth ponderosa pine and Douglas-fir, the species usually used for millwork products.

3. Evaluate the potential for increasing the output of shop lumber from sawmills; if it is substantial, identify the changes in structure or practices needed to develop this potential.

4. Use technical, economic, and operational criteria derived from the above to refine the timber resource data so as to have a better picture of the current and future raw material supply of wood suitable for millwork lumber.

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